

Well known as a bird of Chili and other countries of Western South America. In this species the under wing coverts are white, and the fine scarlet of the throat and breast extends over the abdomen.

Numerous specimens in the Academy Museum, and in Museum Smithsonian Institution.

7. *STURNELLA LOYCA*, (Molina.)

Sturnus loyca, Mol., Dizz. Stor. Nat. Chili, (1782,) 2d ed. p. 212, (1810.)

Sturnella bellicosa, De Filippi.

Pezites brevirostris, Cab., Mus. Hein., p. 191, (1850.)

Leistes albipes, Philip. et Landb. Trosch. Archiv., 1863, p. 128?

This is apparently a smaller bird than the preceding, with a shorter and thicker bill, and the scarlet of the under parts is restricted to the throat, neck and breast, not extending on the abdomen as in the preceding. One fine apparently adult specimen now before me has the *tibiæ* clear white on their inner surfaces, mottled with black on their outer, in which plumage it seems to be *Leistes albipes*, Philip. et Landb., as above cited. The under wing coverts are white, as in the preceding.

The synonymy of this species I find to be difficult, but it is not improbable that it was first described by Dr. Cabanis as above cited, authors to the contrary notwithstanding. Specimens in Mus. Acad.

8. *STURNELLA DE FILIPPII*, (Bonaparte.)

Trupialis defilippii, Bonap. Consp. Av. i. p. 429 (1850.)

Easily distinguished from either of the two preceding by its black under wing coverts. Specimens from Brazil in Museum Academy.

3. *Amblyramphus*.

(Genus *Amblyramphus*, Leach, Zool. Misc. p. 81, 1815.)

9. *STURNELLA HOLOSERICEA*, (Scopoli.)

Xanthornus holosericeus, Scop. Flor. et Faun. Insub. p. 88, (1786.)

Oriolus ruber, Gm. Syst. Nat. i. p. 388, (1788.)

Amblyramphus bicolor, Leach, Zool. Misc. i. p. 82, (1815.)

Sturnus pyrrhocephalus, Licht. Verz. Doubl. p. 18, (1823.)

Sturnella rubra, Vieill. Ency. Meth. ii. p. 635, (1823.)

Leistes erythrocephalus, Swains. Cab. Cy. Birds, ii. p. 275, (1837.)

Leach. Zool. Misc., i. pl. 36.

Numerous specimens of this apparently common species are in the Academy Museum from Brazil. Easily recognized when adult, by its brilliant scarlet head, and *tibiæ* and black body. The young is nearly uniform dull black, the scarlet generally first appearing on the throat and forehead.

This species ends the subfamily *Agelaiinae*, but I am not quite confident that the genera or subgenera *Creadion*, Vieillot, and *Amblycercus*, Cabanis, do not belong here. Such may be the case also with *Hypopyrrhus*, Bonaparte. At present, however, my impression is, that all of these have greater affinities in other groups of the family *Icteridæ*.

A Critical Review of the Family PROCELLARIIDÆ:—Part III; embracing the FULMAREÆ.

BY ELLIOTT COUES, A. M., M. D.

[Continued directly from page 144 of these Proceedings for 1864.*]

The *Fulmareæ*, as I would define them, form a group of the *Procellarinæ* represented as far as is now known by only three genera. These are *Fulmarus*, *Thalasseica* and *Ossifraga*; all closely allied in general form and propor-

* The writer's protracted residence in Arizona, where books and specimens were alike unobtainable, has unavoidably delayed until now the continuation of the series of papers begun in 1864. Efforts will now be made to finish the subject.

tions, though presenting considerable diversity in coloration. The genus *Adamastor* which has been placed among the Fulmars by Bonaparte, seems, as I have attempted to show in a previous paper,* to fall most naturally among the *Puffinæ*; being not widely separable from *Majaqueus*, which Bonaparte himself (C^{on}sp. Av. ii. p. 200) places among the Shearwaters. The position of the somewhat anomalous genus *Daption* is a little uncertain; possessing, as it does, some of the characteristics of the present group. I am of opinion, however, that it is most naturally to be included with the *Æstrelatæ*, under which section I shall hereafter consider it.

The section *Fulmaræ* then, as thus constituted, is composed of large or moderate sized species, having a form very stout, compact, and robust, and being nearly always very light colored. It is apparently the section of Petrels most closely allied to the *Laridæ*, and forming the connecting link between the two families. Particularly in the genus *Thalassoica* is the Laridine aspect very marked.

The bill is always large and robust. The unguis of the upper mandible is strong, very convex in profile, and much hooked at the extremity. That of the lower mandible is never much attenuated nor decurved, with the outline of the gonys decidedly concave; but is short, stout, obtuse, with a straight ascending gonys. The nasal tubes are prominent, wide, long, vertically truncated, usually emarginated at their end; the nasal septum very thin and delicate. The wings are of moderate length, reaching when folded about to the end of the tail; the primaries are very broad. The tail is short; more or less rounded; of 14 to 16 feathers, all of which are broad and subtruncated at their extremities. The feet are comparatively small and weak. The tarsus is slender, compressed, reticulated, shorter than the middle toe. The outer toe is as long or longer than the middle one. The tip of the inner claw about reaches to the base of the middle.

Of the three genera which I regard as the components of this section, *Ossi-fraga* has 16 rectrices, while *Fulmarus* and *Thalassoica* have but 14. Of *Fulmarus* we at present know three species; of *Thalassoica*, two; while *Ossi-fraga* has but a single representative. The section is cosmopolitan.

FULMARUS Leach.

Procellaria sp., Auctorum; nec Linn.

Fulmarus, Leach, Stephen's Gen. Zool. 1825, xiii. p. 233. Type *Proc. glacialis* L. *Rhantistes*, Kaup, Sk. Ent. Eur. Thierw. 1829, p. 37. Same type.

Gen. Char. Bill about two-thirds as long as the head, three-fourths as long as the tarsus; short, very stout, exceedingly robust at the base, where it is higher than broad; the lateral laminae of the upper mandible especially large, and swollen; the unguis short, very stout, convex in outline, commencing to rise almost from the nostrils; commissure greatly curved; the outline of inferior mandibular rami a little concave; the gonys ascending; the sulci of both mandibles deep and distinct; the nasal tubes long, nearly half the culmen, prominent, inflated, their dorsal outline about straight, their apex emarginate, vertically truncated; the nasal septum very thin. Wings of moderate length; reaching when folded about to end of tail; the primaries very broad at their bases, somewhat rapidly tapering to their rounded tips. Second primary nearly as long as the first. Tail of 14 rectrices, all broad, subtruncated; the lateral ones somewhat graduated. Feet rather small and weak; the tibiae exposed for a short distance; the tarsi slender, moderately compressed, about three fourths as long as the middle toe and claw. Outer toe and claw about equal to middle toe and claw; the toe alone longer than the middle without its claw. Inner toe very short, the tip of its claw barely reaching to the base of the middle claw. Hallux short, only observable as a stout obtuse subconical claw.

* Vide Pr. A. N. S. Ph. for April, 1864, p. 117.

Large in size, and very robust in form. Colors white and light pearl blue, with darker primaries.

As above defined, the genus *Fulmarus* is restricted to its type *glacialis*, and the two other closely allied species *pacificus* and *Rodgersii*.

As is the case with all the genera of the family, the name *Procellaria* has been applied to the present genus. As I have already indicated,* I consider *P. pelagica* and its congeners as typical of the genus *Procellaria*. *Fulmarus* appears to be the first distinctive appellation of the present group; having priority over *Rhantistes* of Kaup.

The type of this genus is subject to variations in size, etc., remarkable even in this variable family. In consequence, several races or varieties have been described and named; which I think are properly to be included under *glacialis*. I recognize as valid the three following species.

FULMARUS GLACIALIS (Linn.) Steph.

Procellaria glacialis, Linn., S. N. 1766, p. 213; et auct. nec Pall., nec Forst. *Fulmarus glacialis*, Stephens, Gen. Zool. 1826, xiii. p. 234, pl. 27. Bonaparte, Consp. Av. ii. 1856, p. 187; et al. auct. recent.

Fulmarus glacialis, var. *Audubonii*, Bonaparte, Consp. Av. 1856, ii. p. 187. *Fulmarus glacialis* var. *minor*, Bonaparte, Consp. Av. 1856, ii. p. 187.

"*Procellaria minor*, Kjærbo," fide Bp.

"*Procellaria hyemalis*," Brehm.

Habitat. North Atlantic Ocean.

This species has served as the basis of so many nominal species, caused by its great variations, that, although no description of it is needed, it may be well to notice the differences to be found whenever large series are compared.

Examination of numerous specimens convinces me that the differences in color are those of age and season chiefly if not wholly; since the species passes very gradually from the uniform dull greyish brown of youth to the pure white and pearly blue of the adult condition. There do not seem to be any very well defined stages during this transition. Birds of the year, before the autumnal moult, are entirely fuliginous gray, lighter beneath, with darker margins to the feathers of the back and wing coverts. The tail is about concolor with the rest of the plumage. There is an angular anteocular black spot. The bill and feet are of a dull yellowish or ashy brown. After the moult, the pearly blue of the back extends upon the nape and head; (just as it does in *Rissa tridactyla*;) and the upper tail coverts, and the rectrices are of the same color. The primaries are colored the same as in the mature bird. Spring and summer adults have the pearl blue restricted to the back and wing coverts; other parts of the body being pure white. The distribution of colors is then just as in *Larus canus*, *argentatus*, etc. The dark anteocular spot however seems permanent. The bill is wholly yellow; the feet yellow with a bluish tint.

The variations in size are carefully to be noted; since, taken in connection with a varying length and robustness of bill, they have given rise to nominal species. The average length appears to be about 16.5 inches; there is however a margin of one or even two inches both above and below this standard to be allowed. The wing measures from the carpal joint to the tip of the longest primary, from rather less than 11 to 12.5 inches. The average length of the bill (chord of the culmen) is 1.5; but it may be 1.33 or 1.66, with a corresponding difference in robustness. Young birds are always weak-billed. The tail ranges from about 4 to about 5 inches. The average of the tarsus is about 2 inches: of the middle toe without its claw, 2.25; both varying to the extent of a fourth of an inch or rather more. The feet however as a general rule differ less in dimensions than other parts.

The synonymy of this species is very brief and uninvolved; the points re-

* Proc. A. N. S. Philad'a. March, 1864, p. 79.

quiring considerations being hardly more than those relating to the varieties or supposed species which have been separated from it.

I have before me a rather small and weak-billed specimen* from Greenland, which appears to be an example of what was called *P. minor* by Kjærbo, or *P. glacialis* var. *minor* by Bonaparte. It has no claim that I can discover to be considered as even a variety; as the difference in size from the ordinary standard is by no means unusual. In the var. *Audubonii* of Bonaparte—based upon the bird used for the figures in Audubon's works—there is exhibited a by no means unusual variation in size, or in strength of bill.

While I would thus consider the Atlantic Fulmars as representing but a single species, nothing that I have found in an extensive series tends to invalidate the claims of *F. pacificus* to specific distinction.

FULMARS PACIFICUS (Aud.) Lawr.

Procellaria glacialis, Pallas, Zoog. Rosso-As. ii., 1811, p. 312.. Sed non Linn. nec auct.

Procellaria pacifica, Audubon, Orn. Biog. v. p. 331. Id Bds. N. Amer. vii. 1844, p. 208.

Procellaria (Fulmarus) pacifica, Lawrence in Baird's B. N. A. 1858, p. 826.

Fulmarus glacialis var. *pacificus*, Bonaparte, Consp. Av. ii. 1856, p. 187.

? *Procellaria glacialis (juniores)*, Kuhl, Beit. Zool., 1823, p. 141.

This species, though very closely allied to *glacialis*, and requiring a rather careful comparison to distinguish it, yet appears to differ by constant characters. It is nearly or quite as large as that species; but the feet are, perhaps, a little shorter and weaker. There seems to be a constant difference in the shape of the bill; which, though not much shorter, is considerably weaker, more compressed, and more attenuated and decurved at the tip. The inferior mandibular rami divaricate at a more acute angle. But I have not been able, in examining quite a large series, among which is one of Audubon's types, to find any distinctive characters in the nasal tubes; the dorsal outline of which does not appear to be straighter than that of the Atlantic bird. In fact, one example of *pacificus* has a more concave tube than one of *glacialis*, now before me; nor can I discover that the carination of the tubes is more marked in one species than in the other. One example of *pacificus* shows no trace of any carination.

Some features of coloration are, perhaps, most distinctive of this species. The upper parts are much darker in *pacificus* than in *glacialis*; inclining to a bluish cinereous rather than a pearly blue. The rump and upper tail coverts, in lieu of being nearly pure white, are concolor with the middle of the back, or even darker than it. The bend of the wing, and the secondaries and tertials are somewhat deeper-colored than those of *glacialis*. The bill is bright yellow, lightest on the unguis; the root of which latter is bluish horn-colored. The feet are bright yellow, only slightly obscured on the outer aspect of the tarsus, and on the outer toe. The anteocular spot is smaller and more indistinctly marked than in *glacialis*.

Young birds have the yellow of the bill obscured by brownish or greenish, the unguis especially being quite dark, as are also the feet and toes. The entire plumage is fuliginous grayish brown; deepest on the side of the head; lighter on the under parts of the body, where there is considerable of a smoky cinereous tint. Most of the feathers of the upper parts have cinereous or pearly tips. Some of the tertials are more or less distinctly tipped with grayish white. The remiges and rectrices are brownish black; the former lightest, inclining towards their tips to grayish. The primary shafts are light brown, deepening in color at their apices. The under surfaces of the primaries are cinereous gray.

I thus detail the differences I have been able to find between the two supposed species, considering them as sufficient to establish a species; though

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with equal reason they might be held as indicative of the extreme of variation of a single changeable type, and thus forming only a local race or geographical variety.

The *Procellaria glacialis* of Pallas in all probability refers to this species rather than to the true *glacialis* of Linnæus. I also think that the "*Procellaria glacialis*, juniores ex America Septentrionali allatæ, colore cinerascens-fuliginoso tinctæ" of Kuhl's "Beitrage," p. 141, belongs here rather than to the *Thalassoica glacialoides* to which Dr. Schlegel has referred it.

FULMARUS RODGERSII Cassin.

Fulmarus Rodgersii, Cassin, Cat. Birds North Pacif. U. S. Expl. Exped., in Pr. A. N. S. Ph. 1862, p. 290.

Habitat.—North Pacific Ocean.

I have before me Mr. Cassin's original and type specimen. With exactly the size and very nearly the form of *F. glacialis*, it differs from the latter very decidedly in color, as will be seen by the following comparative description:

The bill is bright yellow, except the base of the unguis of the upper mandible, which is bluish black. The middle of the back, the scapular feathers and some of the lesser wing coverts are a rather dark grayish ash, approaching the hue that is most distinctive of *pacificus*. The rump and upper tail coverts are pure white. The rectrices are fuliginous grayish ash; their inner webs and their extreme apices whitish, their shafts wholly yellowish. The whole of the tertials and the greater wing coverts are pure white; the lesser wing coverts and edge of the wing of the same color, but marbled with the ashy hue of the back. The secondaries are white with yellow shafts; the terminal half of their outer webs grayish brown. The primaries are dull brownish black, their entire shafts yellow, their inner webs to within an inch of their tips white. These markings of the primaries are much like those of *Thalassoica glacialoides*. All the rest of the body is white. The legs and feet are bright yellow; the outer aspect of the tarsus, and the outer toe somewhat obscured by dusky. The nails are ochraceous brown.

Bill along chord of culmen 1.50 inches and hundredths; from feathers on side of lower mandible to its apex 1.40; nasal tubes .60; height of bill at base .80; width about the same; wing from the carpus 12.25; tail 5.50; exterior rectrices .75 shorter; tarsus 2.00; middle toe and claw 2.60; inner do. 2.20.

Some differences in the shape of the bill of this species are readily recognizable. It is even stouter than that of *glacialis*, being at the base fully as wide as high; and the lateral laminae of the upper mandible is bulging and convex rather than straight. The nasal tubes are larger, broader, more depressed, with no traces of median longitudinal carination. Independently of these discrepancies, it is to be distinguished from *glacialis* by the restriction in extent and deep hue of the color of the back; by the white tertials and coverts, dark rectrices, yellow primary shafts, amount of white on inner webs of primaries, etc.

But a single specimen is known to exist in any collection. No. 21304 of the Smithsonian Register. From the North Pacific, the precise locality not known.

THALASSOICA Reich.

Procellaria sp. auctorum.

Thalassoica, Reichenbach, Syst. Av. Type *P. glacialoides*, Smith.

Priocella, Homb. et Jacq. Same type; fide G. R. Gray.

Gen. char. Bill slightly shorter than the head, or tarsus, about three-fifths the middle toe and claw; higher than broad at the base, compressed, not very robust, its sides regularly tapering to the rather thin tip. Unguis attenuated and only moderately hooked; commissure a little curved, outline of inferior mandibular rami, and of gonys, both slightly concave. Nasal 1866.]

tubes two-fifths as long as the culmen, basally wide and depressed, terminally high and compressed. Feet rather small; tarsus much compressed, as long as the inner toe without the claw; about three-fifths the middle toe. Wings and tail as in *Fulmarus*.

This genus differs from *Fulmarus* in little except the bill; in which, however, the distinction is well marked. The bill has, notwithstanding the presence of the nasal tubes, an aspect which is Laridine to a degree not found in any other genus of the family; and the pattern of coloration in the type of the genus is almost precisely that of a *Larus*.

Two species are known to compose the genus. Intimately allied in form, their colors are more widely diverse than is usually found to be the case in congeners of this family.

THALASSOICA GLACIALOIDES (Smith) Reich.

Procellaria glacialis, Forster, Descr. Anim. ed. Licht. 1844, p. 25, No. 21. Nec Linn., nec auct. al.

Procellaria glacialis, Var. B., Gm. S. N. i. 1788, p. 563. Lath. Ind. Orn. ii. 1760, p. 823.

Procellaria glacialoides, Smith, Illust. S. Afric. Bds. t. 51.

Thalassoica glacialoides, Reich. Syst. Av. Bonaparte Consp. Av. 1856, ii. p. 192.

Thalassoica glacialoides var. *polaris*, Bp. Consp. Av. 1856, ii., p. 192.

Thalassoica glacialoides var. *tenuirostris*. Bonaparte, Consp. Av. 1856, ii. p. 192.

Procellaria tenuirostris, Audubon, Orn. Biog., 1839, v., p. 333. Id. Birds North Amer. vii. 1844, p. 210, (fig. nulla.) Lawrence, in Baird's B. N. A., 1858, p. 826.

Procellaria Smithi, Schlegel, Monog. Proc. Mus. Pays Bas, 1863, p. 22.

Prionella Garnoti, Homb. et Jacq. Voy. Pole Sud, pl. 32, fig. 43; fide G. R. Gray.

Habitat.—Southern hemisphere generally, apparently replacing the *F. glacialis*. Columbia River and whole Pacific Coast of North and South America. Cape Horn. Cape of Good Hope. Atlantic and Pacific coasts of Africa. Not in the North Atlantic?

The sulci on the sides of the bill, uniting the lateral laminae with the unguis, are remarkably narrow, shallow, and indistinct; and the bill in other respects calls forcibly to mind that of a small *Larus argentatus*. The colors of the back, and of the primaries even to the white spaces on their inner webs, and the size and shape of the feet and tail are rather those of a Laridine than a Procellaridine bird.

Nasal tubes a third the length of the culmen, basally broad and depressed; terminally narrower and elevated; their dorsal outline concave, subcarinated, their tip deeply emarginated; nasal septum very thin, and so short as not to reach the end of the nasal tube. Culmen flattened from tube to unguis; latter much elevated and very convex. Shape of lower mandible that of *Larus*. Tarsus much compressed, shorter than middle toe without its claw; hardly exceeding the inner toe alone. Outer toe without its claw longer than the middle. Folded wings reach to end of tail. Primaries broad, tapering rather suddenly to their rounded apices. Tail contained $2\frac{1}{4}$ times in the wing from the carpal joint.

Bill yellow; nasal tube, unguis and sometimes basal portion of superior lateral mandibular laminae, bluish horn. Feet yellow. Upper parts uniform clear pearl blue; exactly the shade that obtains in some species of *Larus*. This color begins as a faint wash or shading on the nape, deepening as it proceeds backwards until on the interscapular region it has gained its full intensity; which continues undiminished over the whole back, rump, wing coverts, tertials and tail coverts, to the tips of the rectrices themselves. The feathers just along the edge of the wing, however, are grayish slate. Primaries black,

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their shafts yellowish white at the base, changing to black towards their apices ; their inner webs pearly white near their tips. This white on the first primary extends to within two inches of the tip ; on the rest successively extends nearer the tip of each, till on the innermost it occupies the whole web. Secondaries slaty black on their outer, white on their inner webs. Elsewhere the bird is pure white ; except a small anteocular dusky spot ; and a faint shade of pearl gray on the sides of the breast and body, and on the flanks.

Dimensions. Length 18 to 19 inches, extent of wings about 36. Bill along culmen 2, from feathers on side of lower mandible 1·75 ; its height or width at base ·70 ; nasal tubes ·66. Wing from the carpus 13. Tail 5·25. Tarsus 2 ; middle toe and claw 2·60 ; outer 2·70 ; inner 2·25.

There is no other species towards which the present bears an intimate resemblance. *Th. antarctica* is exceedingly dissimilar in color, though so nearly the same in form. The generic peculiarities—especially of the bill—of *Fulmarus glacialis* or *pacificus* at once distinguish the latter.

Synonymy. The *Proc. glacialis* of Forster's *Descriptiones Animalium* is undoubtedly this species. The expressions regarding the nasal tube—"coerulescens in rostro incarnato,*—apice nigro"; and regarding the primaries—"fusconigræ, margine interiore albidæ," are quite inconsistent with the true *glacialis*. This is the only instance I have met with of the application of the name "*glacialis*" to this species.

The *Procellaria tenuirostris* Audubon is most certainly this species. I have compared Audubon's type specimen with specimens of undoubted *glacialoides* from various localities. Mr. Cassin has shown (U. S. Expl. Exp. 1858, Birds, p. 409) that possibly Audubon's designation has priority over that of Smith.

I do not suppose that the var. *polaris* of Bonaparte's *Couspectus* is in any way diverse from the true *glacialoides*.

I hardly know upon what grounds Dr. Schlegel has laid aside the prior names of this species to give it the appellation "*Smithi*."

THALASSOICA ANTARCTICA Reich.

Procellaria antarctica, Gmelin, S. N. 1788, i. p. 565 ; et auct.

Thalassoica antarctica, Reichenbach, Syst. Av. t. 22, fig. 790. Bonaparte, Consp. Av. 1856, ii. p. 192.

In this species there is the same general character of the nasal tube as in *T. glacialoides* ; though it is comparatively a little broader and shorter, and somewhat less carinated on the median dorsal line. The sulci uniting the different laminae of the bill are rather deeper and more distinct, taking away something of the Laridine aspect, so marked in the other species. The lateral rostral lamina is wider at its base, and tapers more rapidly to the acute apex by which it is united to the unguis. The tip of the lower mandible is more decurved, and the gonys is a little concave.

The coloration of this species is so peculiar, and so widely dissimilar from any other Procellariid, that it is needless to give any description here. The species has I believe no important synonyms.

OSSIFRAGA Hombr. et Jacq.

Procellaria sp. Gmelin, et auct.

Ossifraga, Hombron et Jacquinot.

Char. Tail of 16 rectrices, moderately long, rounded. Wings rather short, and not very pointed. Tarsi short, much less than the middle toe without its claw ; compressed, stout, reticulated. Bill as long or rather exceeding the tarsus, very robust ; the nasal case very long, depressed, carinated, the aperture small. Of immense size and powerful organization.

* "Bill black and flesh-colored, the latter hue fading to whitish on drying." I find on the label of a specimen collected by the North Pacific Exploring Expedition. I note this here because the bill is generally described as "yellowish" and to show how pertinent is Forster's expression "incarnato, apice nigro."

But a single species of this genus is known; which in size vastly exceeds all other *Procellariæ*, and is only itself surpassed by the *Diomedinæ*.

OSSIFRAGA GIGANTEA (Gm.) Reich.

Procellaria gigantea, Gmelin, Syst. Nat. i. 1788, p. 563. Lawrence, Birds N. A. 1858, p. 825, et al. auct.

Ossifraga gigantea, Reichenbach, Syst. Av. t. 20, fig. 332. Bonaparte, Consp. Av. 1855, ii. p. 186.

? *Procellaria brasiliana*, Latham, Ind. Orn. ii. 1790, p. 821, No. 2. Gm. S. N. i. 178, p. 564.

Procellaria ossifraga, Forster, Descr. Anim Ed. Licht., 1844, p. 343.

"*Quebranthuesos*;" "Bonebreaker." VULGO.

Habitat. Chiefly the Southern Seas. Has been taken off the Coast of Oregon.

Bill exceedingly robust, compressed, higher than broad at the base; longer than the head, rather longer than the tarsus (chord of the arc of the culmen about equal to the tarsus); sulci separating the rostral laminae very distinctly defined. Nasal case very long, more than half the length of the culmen*; basally exceedingly broad, being nearly as wide as the bill; narrowing anteriorly to the small nearly circular apical orifice; on the upper surface so flattened as to be a little concave; the median carination strongly marked, though the ridge is rather broad than sharp, and more elevated anteriorly than at the base; the apex of the case vertically truncated, not emargined. The frontal feathers extend in an obtuse angle a little way upon the root of the case. Unguis large and strong, its dorsal outline very broad and not sharp; regularly decurved, its tip rather obtuse. Commissure much sinuated for its whole length. Gape of mouth moderate, the angle of the commissure falling far short of the eye. Outline of lower mandibular rami about straight; angle of gonys obtuse, its dorsal outline straight, ascending. Feathers of the chin extending quite to the symphysis. Feet very large and stout. Tibiæ bare for a considerable portion of their extent. Tarsus short, stout, much compressed, reticulated: the plates minute posteriorly and superiorly; larger and transversely very broad on the infero-anterior aspect. Toes very long; the outer with its claw as long as the middle; its claw alone shorter than that of the middle toe. Webs full. Hallux a very stout, nearly straight, subconical, obtuse claw. Wings short; not very pointed; when folded falling considerably short of the end of the tail. Tail of moderate length, or rather short for this group; much graduated; of 16 instead of as usual 14 feathers.

Dimensions. Averaging about 3 feet in length by 7 in extent. Bill $3\frac{1}{2}$ to 4 inches. Tarsus $3\frac{1}{2}$. Middle toe and claw $5\frac{3}{4}$: outer do. about the same; inner do. $4\frac{1}{2}$. Wing from the carpal joint about 20 inches.

The species is found in quite diverse states of plumage. The upper parts are of a varying shade of brown, and more or less mottled with dull white, the edges and tips of many of the feathers being thus colored. Often however there are no traces of this white mottling, and the dorsal plumage is of a uniform sombre fuliginous. The wings and tail seem to be nearly always plain dark brown. In adult birds the under parts, and a portion of the neck in front are white. The amount of this white varies with age; and young or immature birds have the whole under parts similarly colored with the rest of the body; though the hue is usually rather lighter and duller. The gradations in color between old and young are very gradual; scarcely any two specimens, not perfectly mature, being found exactly alike. The feet of some specimens are yellowish, more or less obscured by dusky; of others are uniform fuliginous brownish black. The bill is yellow in all the specimens I have seen. As a remarkable state of plumage which I do not recollect to have seen given, I may instance a specimen in the Philadelphia Academy, which is *pure white* all over,

* But its length seems liable to some considerable variation. I believe it always extends nearly or quite to the root of the unguis.

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even to the wings and tail; the continuity of the white only interrupted by a few isolated brown feathers sparsely scattered at irregular intervals over the body. Other specimens in the Academy Museum are in very nearly the plumage described by Gmelin and Latham as *P. Brasiliana*; so that there can be little doubt of the propriety of referring the latter to this species.*

The species and genera treated of in this paper are so few and so well known that an analytical synopsis does not seem to be required.

(To be continued.)

Description of twelve new species of UNIONIDÆ from South America.

BY ISAAC LEA.

The species described and figured in this paper were procured in South America by Don Patricio M. Paz, of Madrid, and very obligingly submitted to me. Some of them fortunately were in alcohol, thus preserving the soft parts, which are of great interest. These have been carefully examined and described, and it will be observed that the South American characteristics of the outer hard parts, as well as the included soft parts, which seem to pertain to the *Uniones* of that continent, are here exhibited. I allude more particularly to the *round palpi*, or mouth lips, and the *divergent fields* of the tips of the beaks, neither of which have I observed in our North American species. Very little attention, heretofore, has been given to the soft parts of the *Unionidæ* of South America, and none to the *embryonic shell*, except by myself. M. d'Orbigny, in his *Voyage dans l'Amerique Meridional*, has imperfectly described and figured the soft parts of some of the genera. Spix, in his *Testacea Fluviatilia Braziliensia*, takes no notice of the soft parts of the species, which he describes and figures with much accuracy.

UNIO PECULIARIS.—Testa lævi, quadrata, compressiuscula, inæquilaterali, postice obtuse angulata, antice rotunda: valvulis crassiusculis, antice aliquanto crassioribus; natibus subprominentibus, ad apices divaricati undulatis; epidermide virido-fusca, eradiata; dentibus cardinalibus parviusculis, compressis, obliquis, in utroque valvulo duplicibus; lateralibus longis, lamellatis curvisque; margarita cærul-o-alba et iridescente.

Embryonic Shell subtriangular, light brown; dorsal line rather long and straight; side margins irregular and unequal—one being a segment of a circle, the other an irregular curve line—forming an obtuse angle at the base: basal margin obtusely angular and furnished with hooks; granulate over the whole surface.

Hab.—South America, Don Patricio M. Paz.

This very peculiar and unique form is now for the first time observed. Its unequal lateral margins give it an abnormal and lapsed appearance, totally differing in this from any other species known to me.

UNIO FIRMUS.—Testa lævi, elliptica, subinflata, valde inæquilaterali, postice et antice rotundata; valvulis crassiusculis, antice aliquanto crassioribus; natibus prominulis; epidermide viridi-fusca, eradiata; dentibus cardinalibus subcrassis, compressis; in utroque valvulo duplicibus; lateralibus longis, lamellatis subcurvisque; margarita argentea et valde iridescente.

Hab.—South America, Don Patricio M. Paz.

UNIO RUGOSOSULCATUS.—Testa sulcata, triangulari, subinflata, subequilaterali, postice biangulata, antice oblique rotundata; valvulis percrassis, antice crassioribus; natibus prominentibus; epidermide olivacea, rugoso sulcata, obsolete radiata; dentibus cardinalibus crassis, rugosis, elevatis; later-

* Bonaparte (Consp. Av. ii. p. 172) makes the *Procellaria brasiliana* Gm. Lath. to be the bird now known as *Graculus* or *Phalacrocorax brasilianus*.